Stress Corrosion Cracking Class Exercise

Type	Susceptible Alloys	Conditions for Cracking	Fixes
Chloride	300 Series Stainless Steels	A. Evaporative Heat Flux Which Produces Cl^- Deposits B. Usually Above 140-150°F (60-65°C) C. Low pH is Bad	A. Stress Relief B. Use Duplex or Ferritic Stainless Steels C. Use High Nickel (>30-40%) Alloys, Titanium, Copper Alloys
Polythionic	300 Series Stainless Steels (Sensitized)	A. Shutdowns B. Water and Sulfide Scale	A. Use 321 SS or 347 SS B. Shutdown Precautions: (1) Soda Ash Wash and (2) N_2 Blanket
Caustic	300 Series Stainless Steels and Carbon Steel	A. Hot Deposits	A. Stress Relief B. Use Monel or Other Nickel-Based Alloys C. Keep Generator Tubes Submerged
Ammonia	Brasses (Cu-Zn)	A. Ammonia + O_2 + H_2O	A. Remove O_2 and Use Acid Washes at Shutdown B. Use Alloys Without Zinc (e.g., CuNi)
Wet H_2S	Carbon Steel Vessels	A. H_2S Level >50 ppm and H_2O B. More Likely if Cyanides or Ammonia Present C. Mostly Vessels, Rarely Piping	A. Use Coating or Cladding B. Remove CN^- With Polysulfide